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NOTICE OF ALLOWANCE AND FEE(S) DUE

22971 7590 08/08/2008

MICROSOFT CORPORATION
ONE MICROSOFT WAY
REDMOND, WA 98052-6399

EXAMINER	
DENG, ANNA CHEN	
ART UNIT	PAPER NUMBER
2191	

DATE MAILED: 08/08/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,654	09/05/2003	Cedric Fournet	MS1-1700US	8301

TITLE OF INVENTION: REVIEWING THE SECURITY OF TRUSTED SOFTWARE COMPONENTS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1440	$300	$0	$1740	11/10/2008

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

22971 7590 08/08/2008

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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,654	09/05/2003	Cedric Fournet	MS1-1700US	8301

TITLE OF INVENTION: REVIEWING THE SECURITY OF TRUSTED SOFTWARE COMPONENTS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1440	$300	$0	$1740	11/10/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
DENG, ANNA CHEN	2191	717-133000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☐ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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EXAMINER	
DENG, ANNA CHEN	
ART UNIT	PAPER NUMBER
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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 755 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 755 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	10/656,654	FOURNET ET AL.	
	Examiner	Art Unit	
	ANNA DENG	2191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *5/7/2008*.

2. ☒ The allowed claim(s) is/are *1-23,26-51 and 54-77*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

1. This action is in response to amendment filed on 5/7/2008.

2. The rejection under 35 U.S.C. 101 to claims 73-77 is withdrawn in view of applicants' amendment.

3. The rejection under 35 U.S.C. 102 (e) as being anticipated by Rioux, USPN 7,051,322 B2 to Claims 1-4, 27-32, and 55-58 is withdrawn in view of applicants' amendment.

4. The rejection under 35 U.S.C. 103 (a) as being unpatentable over Rioux, USPN 7,051,322 B2, in view of Berg et al., USPUB 2005/0010806 A1 to claims 5-26, 33-54, and 59-77 is withdrawn in view of applicants' amendment.

5. Claims 1, 29, 57, 63, 68, and 73 have been amended (see Examiner's Amendment below).

6. Claims 24-25, and 52-53 have been canceled (see Examiner's Amendment below).

7. Claims 1-23, 26-51, and 54-77 are pending.

8. Claims 1-23, 26-51, and 54-77 are allowing.

EXAMINER'S AMENDMENT

9. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Jeffrey R. Sadlowski (Reg. No. 47,914) on 7/29/2008 to place the application in condition for allowance.

The application has been amended as follows:

In the Claims:

Claims 24-25, and 52-53 have been canceled.

Claims 1, 29, 57, 63, 68, and 73 have been amended as following:

1. (Currently Amended) A method comprising:

receiving into an execution environment input component code and a runtime security policy, wherein the runtime security policy comprises an assignment of rights to the input component code and security checks performed as the input component code is loaded; and

generating a call graph of call paths through the input component code simulated in combination with at least one symbolic component representing additional arbitrary code that complies with the runtime security policy, wherein the generating operation comprises:

generating a class hierarchy that contains classes of the input component code and symbolic classes that represent classes of the arbitrary code;

generating at least one constraint associated with a virtual call in the input component code;

evaluating the at least one constraint by a symbolic computation on potential target classes for the virtual call in the generated class hierarchy;

generating at least one constraint associated with either a security demand or a security assert in the input component code;

evaluating the at least one constraint by a symbolic computation on dynamic permissions of the input component code and on a parameter permission of the security demand or the security assert; and

conditionally generating at least one additional constraint associated with one or more instructions located in the input component code after the security demand or assert, responsive to the evaluating operation.

29. (Currently Amended) A computer program storage medium encoding a computer program for executing on a computer system a computer process, the computer process comprising:

receiving into an execution environment input component code and a runtime security policy, wherein the runtime security policy comprises an assignment of rights to the input component code and security checks performed as the input component code is loaded; and

generating a call graph of call paths through the input component code simulated in combination with at least one symbolic component representing additional arbitrary code that complies with the runtime security policy, wherein the generating operation comprises:

generating a class hierarchy that contains classes of the input component code and symbolic classes that represent classes of the arbitrary code;

generating at least one constraint associated with a virtual call in the input component code;

evaluating the at least one constraint by a symbolic computation on potential target classes for the virtual call in the generated class hierarchy;

generating at least one constraint associated with either a security demand or a security assert in the input component code;

evaluating the at least one constraint by a symbolic computation on dynamic permissions of the input component code and on a parameter permission of the security demand or the security assert; and

conditionally generating at least one additional constraint associated with one or more instructions located in the input component code after the security demand or assert, responsive to the evaluating operation.

57. (Currently Amended) A system comprising:

a processor comprising a processing unit;

a call graph generator executing on the processing unit that receives into an execution environment input component code and a runtime security policy and generates a call graph of call paths through the input component code simulated in combination with at least one symbolic component that represents additional arbitrary code that complies with the runtime security policy, wherein the runtime security policy comprises

an assignment of rights to the input component code and security checks performed as the input component code is loaded, wherein the call graph generator further:

generates a class hierarchy that contains classes of the input component code and symbolic classes that represent classes of the arbitrary code;

generates at least one constraint associated with a virtual call in the input component code;

evaluates the at least one constraint by a symbolic computation on potential target classes for the virtual call in the generated class hierarchy;

generates at least one constraint associated with either a security demand or a security assert in the input component code;

evaluates the at least one constraint by a symbolic computation on dynamic permissions of the input component code and on a parameter permission of the security demand or the security assert; and

conditionally generates at least one additional constraint associated with one or more instructions located in the input component code after the security demand or assert, responsive to the evaluating operation.

63. (Currently Amended) A method comprising:

analyzing relative to at least one query a call graph of call paths through input component code simulated in combination with at least one symbolic component representing additional arbitrary code that complies with a runtime security policy, wherein the runtime security policy comprises an assignment of rights to the input

component code and security checks performed as the input component code is loaded, wherein the analyzing operation comprises:

generating a class hierarchy that contains classes of the input component code and symbolic classes that represent classes of the arbitrary code;

generating at least one constraint associated with a virtual call in the input component code;

evaluating the at least one constraint by a symbolic computation on potential target classes for the virtual call in the generated class hierarchy;

generating at least one constraint associated with either a security demand or a security assert in the input component code;

evaluating the at least one constraint by a symbolic computation on dynamic permissions of the input component code and on a parameter permission of the security demand or the security assert; and

identifying a subset of the call paths in the call graph that satisfy the query.

68. (Currently Amended) A computer program storage medium encoding a computer program for executing on a computer system a computer process, the computer process comprising:

analyzing relative to at least one query a call graph of call paths through input component code simulated in combination with at least one symbolic component representing additional arbitrary code that complies with a runtime security policy, wherein the runtime security policy comprises an assignment of rights to the input

component code and security checks performed as the input component code is loaded, wherein the analyzing operation comprises:

generating a class hierarchy that contains classes of the input component code and symbolic classes that represent classes of the arbitrary code;

generating at least one constraint associated with a virtual call in the input component code;

evaluating the at least one constraint by a symbolic computation on potential target classes for the virtual call in the generated class hierarchy;

generating at least one constraint associated with either a security demand or a security assert in the input component code;

evaluating the at least one constraint by a symbolic computation on dynamic permissions of the input component code and on a parameter permission of the security demand or the security assert;

conditionally generating at least one additional constraint associated with one or more instructions located in the input component code after the security demand or assert, responsive to the evaluating operation; and

identifying a subset of the call paths in the call graph that satisfy the query.

73. (Currently Amended) A system comprising:

a processing unit and a memory;

a call graph analyzer executing on the processing unit, the call graph analyzer analyzing relative to at least one query a call graph of call paths through input component code simulated in combination with at least one symbolic component representing

additional arbitrary code that complies with a runtime security policy, wherein the runtime security policy comprises an assignment of rights to the input component code and security checks performed as the input component code is loaded, wherein the call graph analyzer further:

generates a class hierarchy that contains classes of the input component code and symbolic classes that represent classes of the arbitrary code;

generates at least one constraint associated with a virtual call in the input component code;

evaluates the at least one constraint by a symbolic computation on potential target classes for the virtual call in the generated class hierarchy;

generates at least one constraint associated with either a security demand or a security assert in the input component code;

evaluates the at least one constraint by a symbolic computation on dynamic permissions of the input component code and on a parameter permission of the security demand or the security assert;

conditionally generates at least one additional constraint associated with one or more instructions located in the input component code after the security demand or assert, responsive to the evaluating operation, and

identifying a subset of the call paths in the call graph that satisfy the query.

--END--

REASONS FOR ALLOWANCE

10. The following is an examiner's statement of reasons for allowance:

The cited prior art taken alone or in combination fail to teach, in combination with the other claimed limitations, generating a class hierarchy that contains classes of the input component code and symbolic classes that represent classes of the arbitrary code; generating at least one constraint associated with a virtual call in the input component code; evaluating the at least one constraint by a symbolic computation on potential target classes for the virtual call in the generated class hierarchy; generating at least one constraint associated with either a security demand or a security assert in the input component code; evaluating the at least one constraint by a symbolic computation on dynamic permissions of the input component code and on a parameter permission of the security demand or the security assert; and conditionally generating at least one additional constraint associated with one or more instructions located in the input component code after the security demand or assert, responsive to the evaluating operation as recited in independent claims 1, 29, 51, 63, 68, and 73.

The closest cited prior art, the combination of Rioux, USPN 7,051,322 B2 (Rioux), and Berg et al., USPUB 2005/0010806 A1 (Berg), teaches a method provides an analysis tool for reviewing security of trusted software components during development. However, the combination of Rioux and Berg fails to teach generating a class hierarchy that contains classes of the input component code and symbolic classes that represent classes of the arbitrary code; generating at least one constraint associated with a virtual call in the input component code; evaluating the at least one constraint by a symbolic computation on potential target classes for the virtual call in the generated class

hierarchy; generating at least one constraint associated with either a security demand or a security assert in the input component code; evaluating the at least one constraint by a symbolic computation on dynamic permissions of the input component code and on a parameter permission of the security demand or the security assert; and conditionally generating at least one additional constraint associated with one or more instructions located in the input component code after the security demand or assert, responsive to the evaluating operation as recited in independent claims 1, 29, 51, 63, 68, and 73, also as pointed out in applicants' Remarks, page 19, paragraph 5.

These claimed limitations are not present in the prior art of record and would not have been obvious, thus all pending claims 1-23, 26-51, and 54-77 are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anna Deng whose telephone number is 571-272-5989. The examiner can normally be reached on Mondays to Fridays 9:30 - 6:00.
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wei Zhen can be reached on 571-272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Anna Deng/

Examiner, Art Unit 2191

7/29/2008

/Wei Zhen/

Supervisory Patent Examiner, Art Unit 2191